

REMARKS

The Applicant has now had an opportunity to carefully consider the comments set forth in the Office Action mailed February 7, 2005. The allowance of **claims 22-28**, the apparent withdrawal of the restriction requirement and the recognition of allowable subject matter in **claims 4-14, 16 and 19-22** is noted with appreciation. Nevertheless, amendment, reexamination and reconsideration of the application are respectfully requested.

The Office Action

In the Office Action mailed February 7, 2005:

claims 22-28 were allowed;

claims 4-14, 16 and 19-21 were objected to but found to include allowable subject matter;

claims 1-3 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,237,517 to Harrington, et al. ("Harrington"); and

claims 15, 17 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,473,446 to Perumal, Jr., et al. ("Perumal").

The Present Application

By way of brief review, the present application is directed methods and systems operative to map a color specification to output colorant amounts where the output colorants include two colorants of similar hue. For example, the invention finds use where inks or colorants such as cyan and fluorescent cyan, magenta and fluorescent magenta, and/or yellow and fluorescent yellow are available for use in rendering an image. Colorants in pairs, such as, for example, cyan and fluorescent cyan have similar hues, but vary in intensity and/or saturation (page 1, lines 14-21). Colorants of similar hue are to some degree redundant because a gamut of colors that can be produced with them overlap. Therefore, colorants of similar hue are also called redundant colorants. It is difficult to select a particular combination of redundant colorants to produce any given color. Additionally, an appropriate amount of each chosen colorant must be also determined (page 2, lines 19-26).

The use of additional colorants of similar hue to those available in the prior art can improve rendered image quality. A library of color correction and transformation techniques is available for classic colorant combinations. Therefore, a method for

mapping a classic color specification to colorant amounts when a rendering device can use both a classic set of colorants as well as a set of additional colorants having similar hue to the prior art or classic colorants that takes advantage of the current library of correction and transformations is desirable (page 5, lines 8-19).

As indicated above, the present application is directed to methods and systems therefor.

The Cited References

In contrast, the primary reference of the Office Action to Harrington (the same inventor as the present application) discloses a method of mapping full color images to highlight color images which provides excellent results for both pictorial images and presentation graphics (Abstract). A significant amount of color printing can be performed using a highlight color. In this type of printing, only two inks (i.e., colorants) are used in the printing process. These inks comprise black and a highlight color (usually red or blue) (column 1, lines 27-31).

It is respectfully submitted that the cited Harrington reference does not disclose or suggest mapping a color description to output colorant amounts where the output colorants include two colorants of similar hue or mapping a color specification to colorant amounts when a projected region of color space is to be produced by a selection of colorants from a set of colorants including a first colorant, a second colorant and a third colorant, the second colorant being of similar hue with respect to the first colorant.

It is respectfully submitted that Perumal allegedly discloses a system that selectively enables a printer to deposit on a sheet C, M, Y and K color dots at each of a plurality of pixel locations to produce a color image. The system includes a memory for storing C, M, Y and K color values for each pixel in the color image and a processor for controlling selective deposition of the C, M, Y and K colors (column 5, lines 15-20).

Perumal allegedly provides a halftoning technique that produces print quality near error diffusion with the speed of a dither by dithering on a color vector (column 5, lines 15-35). Perumal discusses cyan, magenta, yellow and black colorants and a C, M, Y, K color space (column 7, lines 1-2). However, it is respectfully submitted that Perumal does not disclose or suggest mapping a classic color description to a redundant color description.

The Claims are not Anticipated

Claims 1-3 were rejected under 35 U.S.C. §102(b) as being anticipated by Harrington.

In explaining the rejection of **claim 1**, the Office Action directs the attention of the Applicant to FIG. 1 which illustrates the three-dimensional full color space (column 3, lines 36-37). The Office Action characterizes the figure as reading on “a method of color specification to colorant amounts when a projected region of color space is to be produced by a selection of colorants from a set including a first colorant, a second colorant and a third colorant.” However, **claim 1** recites a method of mapping a color specification to colorant amounts when a projected region of color space is to be produced by a selection of colorants from a set of colorants including a first colorant, a second colorant and a third colorant, the second colorant being of similar hue with respect to the first colorant. It is respectfully submitted that FIG. 1 of Harrington is unrelated to colorants, but is, instead, a representation of the gamut of full colors (column 1, lines 38-40) (i.e., all the colors of the rainbow). Additionally, FIG. 1 of Harrington does not disclose or suggest a projected region of color space is to be produced by a selection of colorants from a set including a first, second and third colorant, the second colorant being of similar hue with respect to the first colorant.

Further in this regard, the Office Action directs the attention of the Applicant to column 6, lines 41-44. However, the cited portion is taken from a discussion of a definition of hue proposed by A. R. Smith in “Color Gamut Transform Pairs,” *Computer Graphics*, Volume 12, No. 3, pp. 12-19 (1978) (column 6, lines 33-36). The cited portion indicates that under this definition, red is associated with a hue value of 0 and yellow is associated with a hue value of 1. However, the discussion is unrelated to colorants and does not disclose or suggest mapping a color specification to colorant amounts when a projected region of color space is to be produced by a selection of colorants from a set of colorants including a first colorant, a second colorant and a third colorant, the second colorant being of similar hue with respect to the first colorant. Instead, it is respectfully submitted that the Harrington reference discusses mapping full color images to highlight color images wherein only two inks (colorants) are used in the printing process (column 1, lines 28-31).

As pointed out by the Office Action, Harrington discusses a two-dimensional triangle **14** which is a slice from the full color double hexagonal cone of FIG. 1. It is respectfully submitted that the two dimensions of the triangle **14** are related to the two

colorants used in the highlight color rendering discussed by Harrington (e.g., black and red). Additionally, as pointed out by the Office Action, Harrington discusses a second triangle **22** which represents a mapping of colors of any given hue to printable colors in the two-dimensional color gamut represented by the first triangle **14** (column 4, lines 7-16). While the discussion related to the second triangle **22** is related to a mapping, it is respectfully submitted the discussion does not disclose or suggest designating a first portion of the region to be produced by a first subset of colorants consisting of two of the first, second and third colorants and designating a second portion of the region to be produced by a second subset of colorants. Indeed, it is respectfully submitted that the Harrington reference does not disclose a third colorant. Furthermore, it is respectfully submitted that Harrington does not disclose or suggest designating a second portion of the region to be produced by a second subset of colorants.

Additionally, **claim 1** has been amended to recite designating a second portion of the region to be produced by a second subset of the first second and third colorants that is different from the first subset. It is respectfully submitted that the amendments to **claim 1** are supported throughout the specification. For example, see page 11, lines 4-31; page 10, line 29 – page 11, line 3; and page 12, lines 7-33.

It is respectfully submitted that Harrington does not disclose or suggest producing a projected region of color space from a set of colorants including two colorants of a similar hue and a third colorant. Furthermore, even if Harrington is construed to disclose designating a first portion of a region to be produced by a first subset of colorants consisting of two of three colorants, Harrington does not disclose or suggest designating a second portion of the region to be produced by a second subset of the three colorants that is different from the first subset.

For at least the foregoing reasons, **claim 1** as well as **claims 2** and **3**, which depend therefrom, is not anticipated by Harrington.

Additionally, **claim 2** recites designating the second portion of the region to be produced by the first colorant and the second colorant. As explained above, **claim 1** recites that the second colorant is of a similar hue with respect to the first colorant. Harrington does not disclose or suggest designating a second portion of the region to be produced by two colorants having similar hue. The first triangle **14** referenced by the Office Action outlines a gamut of producible colors of a particular highlight printer. Those colors are produced with two colorants (e.g., black and red). The second triangle **22** maps colors of a particular hue to a subset (i.e., the second triangle **22**) of the

producible colors **14**. It is respectfully submitted that Harrington does not disclose or suggest designating a second portion of a region to be produced by a first colorant and a second colorant wherein the first and second colorants have a similar hue.

For at least the foregoing additional reasons, **claim 2** is not anticipated by Harrington.

Claim 3 recites designating the second portion of the region to be produced by the first colorant, second colorant and the neutral colorant. As indicated above, it is respectfully submitted that Harrington does not disclose or suggest producing a second portion of a region with three colorants. Furthermore, Harrington does not disclose or suggest producing a portion of a region with three colorants wherein two of the three colorants have a similar hue.

For at least the foregoing additional reasons, **claim 3** is not anticipated by Harrington.

Claims 15, 17 and 18 were rejected under 35 U.S.C. §102(b) as being anticipated by Perumal.

In explaining the rejection of **claim 15**, the Office Action directs the attention of the Applicant to discussion in Perumal of a C, M, Y, K color space and asserts that the discussion reads on a method of mapping a classic color description to a redundant color description. However, it is respectfully submitted that nothing in the disclosure that a color can be described in terms of a C, M, Y, K color space discloses or suggests mapping a classic color description (even in a C, M, Y, K color space) to a redundant color description (i.e., one including colorants of a similar hue). Additionally, the Office Action asserts that Perumal discloses a hue that ranges from colorants C1 to C2 and directs the attention of the Applicant to column 7, lines 19-23 and column 8, lines 31-34.

The Office Action asserts that this disclosure reads on for each non-neutral colorant value in the classic color description, determining a first amount of a primary colorant and determining a first amount of a secondary colorant, said secondary colorant having substantially the same hue as the primary colorant and arranging the first primary and secondary colorant amounts determined for each colorant value in the classic color description as a first redundant color description containing non-neutral colorant values.

However, it is respectfully submitted that Perumal does not disclose or suggest that the colorants C1 and C2 are of a similar hue. Indeed, it is respectfully submitted that the referenced sections of Perumal are related to a discussion of an HPG color space, machine space color vector and color control concept (column 7, lines 4-5; column 7,

lines 30-32; column 7, lines 56-57; column 8, lines 24-26). Perumal uses the phrase -- primary component -- and -- secondary component -- in a discussion of converting and RGB (red, green, blue) color vector or triplet into an HPG color vector (column 8, lines 47-67). However, Perumal indicates that the primary component is made up of cyan, magenta or yellow (column 8, lines 60-61) and that the secondary component is made up of red, green or blue (column 8, line 65). It is respectfully submitted that none of cyan, magenta and yellow are of similar hue to any of red, green and blue. Therefore, it is respectfully submitted that the cited portion of Perumal cannot disclose or suggest determining a first amount of a primary colorant and determining a first amount of a secondary colorant, said secondary colorant having substantially the same hue as the primary colorant.

For at least the foregoing reasons, **claim 15**, as well as **claims 17** and **18**, which depend therefrom, is not anticipated by Perumal.

Telephone Interview

In the interests of advancing this application to issue the Applicant respectfully request that the Examiner telephone the undersigned to discuss the foregoing or any suggestions that the Examiner may have to place the case in condition for allowance.

CONCLUSION

Claims 1-21 remain in the application. **Claim 1** has been amended. For at least the foregoing reasons, the application is in condition for allowance. Accordingly an early indication thereof is respectfully requested.


No additional fee is believed to be required for this Amendment A. However, the undersigned attorney of record hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Deposit Account No. 24-0037.

In the event the Examiner considers personal contact advantageous to the disposition of this case, he/she is hereby authorized to call John P. Cornely, at Telephone Number (216) 861-5582.

Respectfully submitted,

FAY, SHARPE, FAGAN,
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5/3/05
Date


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